| Los Alamos National Laboratory<br>**Environmental Restoration Program**<br>Standard Operating Procedure | No: LANL-ER-SOP-06.13 Rev: 0 |
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# Surface Water Sampling

| | (Print Name) | (Signature) | (Date) |
|---|---|---|---|
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# SURFACE WATER SAMPLING

## 1.0 PURPOSE

This procedure describes methods of sampling surface water bodies and documenting all aspects of surface water sample collection.

## 2.0 SCOPE

### 2.1 Applicability

This procedure is applicable for collection of surface water samples for the Environmental Restoration program.

### 2.2 Training

The field team leader and field team members should be familiar with the objectives of surface water sampling at the specific site, and must document that they have read and understand this procedure and the procedures in Section 1.0, General Instructions.

## 3.0 DEFINITIONS

A. Surface water samples: Water collected from streams, ponds, lagoons, seeps, springs, rivers, lakes, or other water flowing or impounded at the ground surface comprise surface water samples.

B. Grab samples: A specific location at a given time is represented by a discrete aliquot. The sample is collected all at once and at only one particular point in the sample medium.

## 4.0 BACKGROUND AND/OR CAUTIONS

The preferred method for collecting surface water samples uses a peristaltic pump. The pump system allows the union of the filtration assembly with the pump and the sample container. In this method, surface samples are filtered if needed, and collected directly with minimal elapsed time. With a peristaltic pump, only inert materials contact the sample. The acceptable tubing is medical grade silicon, which is replaced after every sample.

An alternate method for this sampling is to collect surface water as grab samples. This method involves dipping a breaker, dipper, or other transfer device into the surface water to retrieve samples. The water sample can also be collected directly by dipping the collection bottle into the water and filling, removing, and capping it. This method has several drawbacks, including problems associated with sampling shallow waters like seeps, springs, or shallow streams. The likelihood of extensive air contact during the filtering of a sample and the time lapse before

preservatives are added to samples are also problems. The only advantage of the grab-sample method is the low cost.

Grab samples can also be collected with a transfer device constructed of Teflon™ or stainless steel. The transfer device is used to transfer liquid and liquid wastes from surface waters to a sample bottle. This method prevents unnecessary contamination that would result if the outer surface of the sample bottle were directly immersed in the liquid. In general, field personnel must avoid using metal transfer devices for trace-metal analysis or plastic devices for sampling trace organics.

The transfer device should not be used in sampling situations where aeration must be avoided or significant material could be lost through adhesion to the transfer container.

## 5.0 EQUIPMENT

Equipment to implement this procedure is listed on the Equipment and Supplies Checklist (Attachment A).

## 6.0 PROCEDURE

A. Coordinate the sampling effort with the Sample Coordination Facility (SCF). The SCF will give guidance regarding sample containers, preservation, and shipment to the SCF.

B. Refer to the site work plan to locate the sampling sites along the surface water body and the appropriate decontamination area.

C. Decontaminate all sampling equipment before taking the first sample and between sampling intervals in accordance with SOP-02.07, General Equipment Decontamination.

D. Sample flowing water in an upstream direction, if necessary.

E. If sampling with a peristaltic pump, follow the steps below:

   1. Refer to general discussion of pumps in SOP-06.01, Purging of Wells for Representative Sampling of Groundwater.

   2. Follow steps A through H, in SOP-06.01.

   3. If the depth to the midpoint of the screened interval exceeds 25 feet or it is anticipated that the depth to water will consistently exceed 25 feet during pumping because of low yield, consider an alternate system.

   4. Follow step I in SOP-06.01.

5. Lower intake into the well a short distance below the water level and begin water removal. Lower suction intake to maintain submergence and allow for successive purging of the water column.

6. Follow steps K through O in SOP-06.01.

7. To collect a sample, use the procedure outlined below.

8. Install new peristaltic pump tubing according to the manufacturer's instructions.

9. Place intake end of the tubing into the water to be sampled and turn on pump. Keep the tubing away from the bottom to minimize the amount of sediment collected. Fill the bottles agitating the water as little as possible. To collect filtered samples, connect the appropriate filter to the outlet end of the pump tube. Before collectiing filtered samples, run a few hundred millilitres of water through the filter.

10. Label sample containers and complete documentation (SOP-01.02, Sample Containers and Preservation, and SOP-01.04, Sample Control and Field Documentation).

F. If sampling with a transfer device, follow the procedure outlined below.

1. Review the Sampling and Analysis Plan for the appropriate number and size of sample containers and preservatives.

2. Use the transfer device to fill the sample containers slowly. Make sure the sample stream flows gently down the sidewall. For sampling some distance offshore, an extension device might be required. If so, firmly attach the transfer device to the dipper and tighten all bolts.

3. Record the appropriate information on the Chain-of-Custody/Request for Analysis Form (SOP-01.04).

4. Perform field chemistry on raw water, in accordance with SOP-06.02.

5. Record the final, stable readings of pH, specific conductance, and temperature on the Water Quality Sampling Record (Attachment B, of SOP-06.02).

6. If raw water is collected directly into the collection bottle, add preservatives after the sample is collected. Rinse the bottle thoroughly and shake it if a preservative (for example, $HNO_3$, HCl, or $H_2SO_4$) has been added.

7. Store the sample immediately according to SOP-01.02.

6.1 Documentation

A. For each sample collected, record all field measurements and chemistry determinations on the Water Quality Sampling Record. Also, initiate a custody record on the Chain-of-Custody/Request For Analysis form, and affix a Sample Label to the sample container.

6.2 Post Operation Activities

A. Ensure that all equipment is accounted for and decontaminated in accordance with SOP-02.07.

B. Send all samples to the SCF.

C. Place a permanent reference (sampling point) marker (for example, a wooden or metal stake with flagging that includes the location and site code) as close to the sampling location as possible.

7.0 REFERENCES

The following procedures are directly associated with this procedure and should be reviewed before surface water sampling:

LANL-ER-SOPs in Section 1.0, General Instructions.
LANL-ER-SOP-02.07, General Equipment Decontamination.
LANL-ER-SOP-06.01, Purging of Wells for Representative Sampling of Groundwater.
LANL-ER-SOP-06.02, Field Analytical Measurements on Groundwater Samples.

Berg, E. L. 1982. "Handbook for Sampling and Sample Preservation of Water and Wastewaters," U.S. Environmental Protection Agency report EPA/600/4-82/029. U.S. Government Printing Office, Washington, D.C.

EPA. 1979. "Methods of Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency report EPA-600/4-79-020. U.S. Government Printing Office, Washington, D.C.

Korte, N., and P. Kearl. 1984. "Procedures for the Collection and Preservation of Ground-water and Surface Water Samples and for the Installation of Monitoring Wells," Bendix Field Engineering Corporation Report, Grand Junction, CO.

8.0 RECORDS

The following forms, completed, are the records generated during the use of this procedure:

A. Water Quality Sampling Record

B. Chain-of-Custody/Request for Analysis Form

C. Daily Activity Log, if appropriate

9.0 ATTACHMENTS

A. Equipment and Supplies Checklist for Surface Water Sampling

B. Water Chemistry Checklist

# EQUIPMENT AND SUPPLIES CHECKLIST FOR SURFACE WATER SAMPLING

_____ Peristaltic pump

_____ Filtration unit

_____ Teflon™ bore and fittings

_____ Clean filters and prefilters

_____ Transfer device for grab samples

_____ 2- or 5-gallon carboy container

_____ Wooden stakes

_____ Survey flagging

_____ Plastic or Teflon™ bucket

_____ Stopwatch

_____ Sample containers and preservatives

_____ Blue Ice or equivalent

_____ Any additional supplies listed in associated procedures, as needed

_____ pH and conductivity meter

_____ Disposable gloves if handling acidified sample containers

_____ Safety glasses/splash guard

_____ Water Quality Sampling Records

_____ Daily Activity Logs

_____ Chain-of-Custody/Request for Analysis Forms

_____ Sample Collection Logs

_____ Variance Logs

## EQUIPMENT AND SUPPLIES CHECKLIST FOR SURFACE WATER SAMPLING (Continued)

_____ Custody Seals

_____ Unique Sample Stickers

_____ Sample Labels

_____ Any additional supplies listed in associated procedures, as needed

# WATER CHEMISTRY CHECKLIST

Complete all blanks before going to the field

_____ Reagents: Alkalinity kit

- _____ Check reagent volumes
- _____ Check glass for breakage

_____ pH meter(s) (circle one)

- _____ Electrode full of fluid
- _____ Electrode glass intact
- _____ Immerse electrode in tap water
- _____ Calibrate electrode, rinse, fill, and replace cap
- _____ Temperature probe in tap water
- _____ Temperature probe in hot water

_____ EC meter

- _____ Battery: OK ____ Dead ____
- _____ Tap water: OK ____ Faulty ____
- _____ Against calibration solution
- _____ Solution temp
- _____ Conductivity of solution

_____ Hand-held thermometer

- _____ Temperature in ice water
- _____ Temperature agrees with lab thermometer

_____ KCl solutions

_____ Filters and tubing

_____ Flow-through bath